REPORT NO. 5

POPULATION PROJECTIONS
EDMONTON METROPOLITAN REGION
1986 - 2011

DEMOGRAPHIC STUDIES

EDMONTON METROPOLITAN REGIONAL PLANNING COMMISSION
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executive summary

EXECUTIVE SUMMARY

The population projection study described in this report is the fifth in a series of Demographic Studies based on the 1986 Census of Canada data.

Future population changes in the Edmonton metropolitan region will be determined by the changes in the following demographic variables: fertility, mortality and net migration.

How The Projections Were Done

The methodology used to produce population projections for the Region is the cohort component approach. There are two basic steps in the application of this method. The first step involves an analysis of past and emerging trends in each of the aforementioned demographic variables. In the second step, the values and rates of these variables are projected and applied to the population of the base year.

Briefly described, the procedure of the projection model takes the population of the base year, calculates births, adds the births, calculates deaths, subtracts the deaths and adds net migration to derive total population and its age-sex distribution five years later. This process is repeated for every five years of the projection period.

One Mortality Assumption Used

A single mortality assumption has been used for the Region's projections. It implies the same future life expectancy levels as those projected by the Alberta Bureau of Statistics for Alberta - female life expectancy at birth will gradually increase from 80.3 years in 1986 to 83 years in 2011, male life expectancy will rise in the same period from 73.3 to 77.2 years.

Three Fertility Assumptions Used

The total fertility rate has been assumed to remain constant at the 1986 level of 1.847 births per woman of childbearing age between 1986 and 1991. For the rest of the projection period between 1991 and 2011 the total fertility rate was assumed to :

a) gradually decline to the level of 1.35 to be in effect between the years 2006 and 2011;

b) remain constant at the 1986 level of 1.847;

c) gradually increase to the population replacement level of 2.1 to be in effect between the years 2006 and 2011.

Three Migration Assumptions Used

Under all migration scenarios net migration is assumed to be 1,500 annually between 1986 and 1991. For the rest of the projection period between 1991 and 2011 net annual migration assumptions are as follows:

low - 1,800
medium - 4,500
high - 7,100.

Nine Possible Projection Scenarios Produced

All possible combinations of one mortality assumption (declining), three fertility assumptions (declining, constant, rising) and three net migration assumptions (low, medium, high) have been used to produce the following nine projection scenarios :

Scenario I declining fertility, low migration
Scenario II declining fertility, medium migration
Scenario III declining fertility, high migration
Scenario IV constant fertility, low migration
Scenario V constant fertility, medium migration
Scenario VI constant fertility, high migration
Scenario VII rising fertility, low migration
Scenario VIII rising fertility, medium migration
Scenario IX rising fertility, high migration

All Projections Scenarios Considered Possible - Medium Projection Most Likely

All the scenarios fall within a plausible range of growth possibilities based on the analysis of past and emerging trends and anticipated changes in the future. Their purpose is to show the outcomes of a reasonably wide range of plausible assumptions. The results of three scenarios (I, V and IX) are described in detail in this report. Projection I - Low (Scenario I) and Projection III - High (Scenario IX) reflect the assumption combinations determining the low and high ends of the projection range. Projection II - Medium (Scenario V) is expected to represent the most likely course of future events in the long run.

Region's Population Will Increase By Between 178,250 - 372,870 By Year 2011

The Region's population is projected to increase in the twenty five year projection period from the 1986 level of 759,427 people to between 937,680 (Projection I) and 1,132,300 (Projection III) in the year 2011. This represents a population increase of between 178,250 and 372,870. The medium Projection II increment of 284,580 people would bring the Region's population to 1,044,000 in the year 2011. This increment represents 79.5 percent of the Region's growth in the past twenty four year period between 1966 and 1990. Projection III's increment of 372,870 slightly exceeds (by 15,000) the 1966-1990 growth.

Distributed evenly throughout the projection period the amount of growth under Projection II would be equal to an average annual increment of 11,380 people. This is nearly identical to the growth anticipated to have occurred in the Region in the recent period between 1986 and 1991. Based on the low and high projections the annual population increase would range between 7,130 and 14,910 people in the whole 1986 - 2001 projection period and between 6,070 and 15,800 in the twenty year time span between 1991 and 2011. It may be noted for comparison purposes that in the fifteen year period between 1971 and 1986 the Region's population grew on average by 15,980 people annually, which is very similar to the projected growth under Projection III in the twenty year period between 1991 and 2011.

Even With No In-migration, Region's Population Will Continue To Grow

The fact that the fertility rate in the Region is presently below the population replacement level sometimes creates an impression that without net migration the Region's population would soon start to decline. This would happen, but not immediately. Computer simulations indicate that because the Region presently has a relatively young population (low crude death rates) with strong age groups of women of childbearing ages, it would take the Region under the current fertility rate (with mortality declining to the year 2011 and then constant) approximately 40 years before it would stop growing. At that time (2026) it would have approximately 958,00 people which is 156,000 more than presently.

Population Will Get Older

All three projections bring home the same basic message about the future -- the Region's population will grow at a slower rate than in the past and its aging process will accelerate. The slowest process of aging can be expected under the high growth Projection III as the rising fertility and high migration would continue adding to the Region's population large numbers of people in the younger age groups. Still, the median age in the Region is projected to increase under this scenario from the 1986 level of 29 years to 34 years at the end of the projection period. Under the slow and medium growth scenarios of Projections I and II, the median age will increase significantly faster -- it will reach 40 years and 36 years by the year 2011, respectively. These important shifts in the median age of the Region's population will result from a variety of factors -- the aging of the baby-boom groups, relatively fewer births as well as increasing longevity of the population. Despite the projected median age increases, the Region's projected population will still remain relatively young compared to the rest of the country - Canada's median age is already now 33 and it has recently been projected to increase under medium growth assumptions to 41 years by the year 2011.[1]

Young Age Groups Will Be Proportionately Smaller, Older Age Groups Larger

The relative size of the young (aged 0-17) and retired (aged 65+) segments of the Region's population can be expected to develop in the future in generally opposite directions. At the beginning of the projection period (1986) the proportion of people 65 years-and-over constituted 7.3 percent of the Region's population. Under the optimistic assumption of rising fertility and high migration (Projection III), this percentage is projected to rise to 11.3 percent while the proportion of the young is to decline, under the same assumptions, from 27.2 to 24.6 percent. Much larger age composition changes can be expected to occur under the assumptions of declining fertility and low migration of Projection I. Under this scenario the elderly's share of the Region's population would nearly double (an increase from 7.3 to 13.5 percent) and that of the young would show a significantly sharper decline (from 27.2 to 18.7 percent). The most dramatic decrease would occur in the group of children of preschool age (0-4), the share of which would drop from 8.4 percent in 1986 to 4.6 percent in 2011. Under this scenario the whole age group 0-17 would, after an initial increase, also decline in absolute terms - from 207,000 in 1986 to 175,000 in 2011. In absolute terms the declining fertility scenario of Projection I would again most significantly affect the preschool age group of children (0-4) whose numbers would, despite a brief increase, decline in the projection period by 32.9 percent (from 64,000 to 43,000). The school age population (5-17) would under Projection I initially increase (from 142,000 in 1986 to 169,000 in 2001) and then decline to 132,000 in the year 2011.

School Age Group Will Be Proportionately Smaller, Although Numbers Will Likely Increase

Under the constant and rising fertility scenarios of Projections II and III, the school age group (5-17) would not drop in absolute terms. On the contrary its numbers would rise in the projection period by 18.8 and 37.6 percent, respectively. (from 142,00 to 170,000 and 197,000 respectively) The proportion of this age group in the total population would, however, decline from 18.8 percent in 1986 to 16.3 and 17.4 percent in the year 2011, respectively. Under the same projections the preschool age group of children would increase in absolute terms from 64,000 to 66,000 and 82,000 respectively, while its proportion would drop from 8.4 percent to 6.3 and 7.2 percent.

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[1]Population Projections for Canada. Provinces and Territories, 1989 - 2011, Statistics Canada, March 1990.

Young Adult Age Groups Important

The group of young adults (18-24) also deserves special attention in this review of future age composition changes. It is an age group of the young adults, the majority of whom enter the labour market for the first time and/or seek an entry in a college, university or other post-secondary educational institution. Their age also predisposes these young adults to start considering establishing their own households and/or families for the first time.

Young Adult Age Groups Will Increase Moderately, But Share Of Total Will Decline

Under the assumptions of the medium and high growth Projections II and III, the number of people aged 18 to 24 would, after an initial decline, increase in the Region from 101,000 in 1986 to 108,000 and 118,000, respectively, at the end of the projection period. Under the declining fertility-low migration scenario of Projection I, the number of people in this age group can be expected to increase between 1991 and 2011 from 81,000 to 97,000. Under all three projections, the 18-24 age group will increase by a smaller percentage than the broader working age group aged 18-64 and as a result its representation in the working age population will decline from 20.3 percent in 1986 to between 15.3 and 16.3 percent in the year 2011. The young adult age group's relative importance in the Region's total population can be expected to diminish between 1986 and 1996. Its share of the total population is projected to decline in this period from 13.3 % to between 9.1 % and 9.6%. Later it will increase again under all three projections to 10.4 percent in the year 2011.

Working Age Groups Will Increase: Proportion Of Total Will Stabilize

The broad working age group (18-64), the large majority of which was already born at the beginning of the projection period, will be only marginally affected by the assumed shifts in fertility. Its number will change mainly depending on the size of net migration, mortality and the size of the younger cohorts shifting over time into this age category. In absolute terms this age group stood at 497,000 in 1986 and is projected to increase by between 28 and 46 percent to between 636,000 (Projection I) and 725,000 (Projection III) by the year 2011. In terms of its proportion of the Region's total population, this age category will record marginal declines under Projections II and III (from 65.5 percent to 65.2 and 64 percent, respectively). Only under the low growth Projection I, its share of the Region's total population will be higher at the end of the projection period (67.8 percent) than at the beginning (65.5 percent).

Over 65 Age Groups Will Increase Significantly

When considering the future of the age group 65-and-over, we can observe that its size at the end of the projection period will be nearly the same under all three projections. This is because the cohorts which will make up this group in the year 2011 are already born and with the same mortality rate assumed for all the projections, their size will vary only as a result of different net migration assumptions.

The age group of elderly people will grow at a high rate in the projection period. Its size will increase from 55,600 in 1986 to between 126,400 and 128,400 in the year 2011, which represents a rise of between 127.6 and 131.1 percent. This high rate of growth will increase the relative weight of the elderly in the Region's population from the 1986 level of 7.3 percent to between 11.3 percent (Projection III) and 13.5 percent (Projection I) by the year 2011.

Average Age Of Over 65 Population Will Also Increase

Not only will the size of the 65-and-over population increase substantially but this group as a whole will also become older. In 1986 the 75+ subgroup constituted 38.5 percent of the over 65 population, but at the end of the projection period this group is expected to account for over 45 percent.

Proportion Of Dependent Population Will Not Change Much Over Projection Period

The projected age distribution changes in the Region's population, particulary those affecting the young and the elderly can be expected to confront the Region with quite new challenges and problems. The fact that the relative strength of the working age population will not change significantly in the next 25 years means that the total dependency ratio[2] will also remain relatively unchanged. What will happen, however, is that with the process of population aging offsetting shifts will occur between the elderly dependency and the child dependency ratios. The elderly dependency ratio will increase under Projections III and II from 11.2 percent in 1986 to between 17.7 and 18.7 percent, respectively, in the year 2011. The child dependency on the other hand, will decline in the same period from 41.6 percent to 34.6 percent (Projection II) and 38.5 percent (Projection III). The total dependency ratio (combined elderly and child) will increase under these two projections from the 1986 level of 52.7 percent to 53.3 percent (Projection II) and 56.2 percent (Projection III). Only under the slow growth scenario of Projection I the total dependency will decline (to 47.5 percent). The child dependency can be anticipated under this projection to be 27.6 percent and that of the elderly 19.9 percent at the end of the projection period. Because the proportions of the working age population will not change significantly in the period under review, the relative amounts of resources available for the dependent population can be expected to be nearly the same (Projections II and III) or even slightly larger (Projection I) than before. Still, the projected age composition changes will likely require significant economic (both private and public) and social adjustments in order to meet the differing future needs of the children and the elderly.

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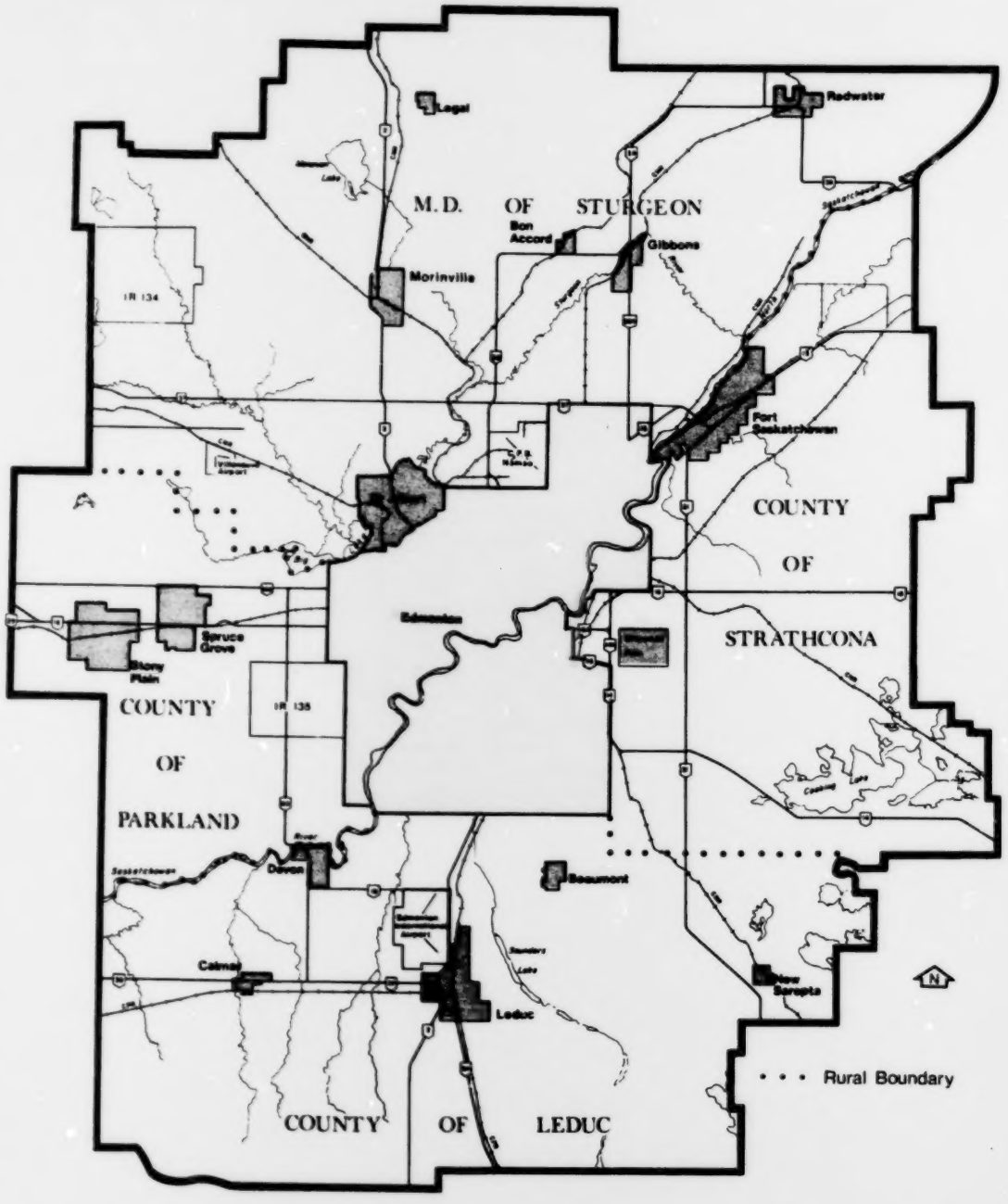
[2]Dependency ratio is the ratio of young and elderly to person of working age; it expresses the number of people of "dependent ages" per 100 persons of "working age."



Map 1 **Edmonton Metropolitan Region Planning Area**

Edmonton Metropolitan Regional Planning Commission

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i. introduction
ii. methodology

I. INTRODUCTION

In the course of its planning activities, the Edmonton Metropolitan Regional Planning Commission finds frequent need for up-to-date demographic statistics for the planning region and its constituent municipalities. Further, the Commission is often asked to supply population data, including population projections, to its member municipalities, government departments and agencies, professionals in related planning fields, the business community and the general public. To satisfy both internal requirements and external requests, the Commission has produced a series of demographic reports updating information about population growth trends and demographic characteristics of the Region's population. The population projections study described in this report is the fifth in a series of Demographic Studies based on the 1986 Census of Canada data. The purpose of this study is to examine past demographic trends in Alberta and the Edmonton area and to produce a set of population projections for the Edmonton Metropolitan Region for the period between 1986 and 2011.

The report is divided into five parts. The first part describes the purpose and contents of the report. The second part outlines the methodology used to prepare the projections. The third part examines recent trends in migration, fertility and mortality in Alberta and the Edmonton Metropolitan Region and extrapolates these trends into the future. The fourth part describes the scenarios underlying the projections. The final part of the report presents the projection results.

In the course of the study, nine projections have been prepared based on all possible combinations of three fertility, one mortality and three net migration assumptions. The report describes in detail Projection I (Scenario I), Projection II (Scenario V) and Projection III (Scenario IX) which correspond to the lowest growth, medium growth and the highest growth. Information about the remaining scenarios can be made available to interested users upon request.

II. METHODOLOGY

A change in size of a population living in a particular area during a certain period of time consists of natural increase plus net migration. Natural increase in population is equal to the total number of births minus the total number of deaths. Net migration is equal to the total number of in-migrants minus the total number of out-migrants. Both the natural increase and net migration can have either positive or negative values. The number of births in a particular population depends on the number of women of childbearing age, their age distribution and their age specific fertility. The number of deaths depends on the size of the population, its age composition and age specific death rates. The level of net migration to the Edmonton Metropolitan Region can be expected to be influenced by the amount of net migration to Alberta as well as by the intra provincial movements of population.

The projection methodology used in this study is the cohort component method. There are two basic steps involved in the application of this method. The first step involves an analysis of past trends in each of the demographic variables -- mortality, fertility and migration. In the second step the values and rates of these variable are projected and applied to the population of the base year. The data input of the projection model includes a base population by five year age groups and sex, age/sex specific death rates, age specific fertility rates, an age sex structure of migrants and assumed levels of net migration. The base population of these projections is the 1986 Census of Canada data. The procedure of the projection model takes the population in the base year, calculates births, adds the births, calculates deaths, subtracts the deaths and adds net migration to derive total population and its age-sex distribution five years later. This process is repeated for every five years of the projection period[1].

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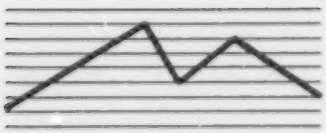
[1]Projection calculations have been made using a computer program developed by Neil Field of the University of Toronto.



iii. past and future trends in
fertility, mortality and net migration

III. PAST AND FUTURE TRENDS IN FERTILITY, MORTALITY AND NET MIGRATION

1. FERTILITY

(a) Past Trends

Similar to trends in other industrialized countries fertility has been declining in Canada and Alberta for more than thirty years. As can been seen in Table 1, Alberta's total fertility decreased sharply between 1956 and 1971 from 4.28 to 2.43 and then continued in a moderate decline to the 1986 level of 1.9. Despite its presently low level, fertility continues to be an important demographic factor affecting population growth and age structure both in Alberta and the Edmonton Metropolitan Region.[2]

As shown in Table 2 Alberta's fertility rate is not uniform throughout the province. Different regions have differing rates. At the lower end of the scale are less populated areas of Census Division 15[3] (1 percent of the provincial population) and Census Division 10 (3.4 percent) with 1.601 and 1.634 total fertility rates, respectively in 1986. Lower fertility has also been experienced in the heavily populated Census Division 6 (30.2 percent of the provincial population) with the 1986 rate of 1.72. The highest fertility in Alberta has been recorded in Census Division 17 and Census Division 3 with rates of 2.902 and 2.838, respectively. It can be noted that these rates were close to Alberta's rate in the year 1966. The fertility rate of Census Division 11 was estimated by the Alberta Bureau of Statics to be 1.847 in 1986. Since the EMRPC region contains 94% of Census Division 11's population it is reasonable to assume that the same fertility rate prevailed in that year in the Region.

Table 3 shows information about fertility rates and their changes occurring among some of the industrialized countries and Canadian metropolitan areas in the period between 1970 and 1986. As can be seen from the table, fertility in all the listed countries has been declining at a rate which has been slowing down toward the end of the period under review. Canada's fertility rate decreased between 1971 and 1986 from 2.19 to 1.67 births per woman. Fertility rates in the listed Canadian metropolitan areas, ranging between 1.24 and 1.46 in 1986, recorded even more pronounced declines than Canada even though there are certain signs of a reversing trend in the last five years of the review period.

(b) Assumptions for the Future

As indicated in the recent report by Statistics Canada[4] ..."the direction that fertility will take has been subject to considerable discussion and speculation among demographers. Much of the discussion has focused on whether fertility will continue to fall or will stabilize at the present level. Few expect another upward cycle similar to the post-war baby boom. However, a slight upturn in fertility should not be ruled out. There has recently been some indication of such possibility".

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[2]It may be interesting to note that in the period between 1981 and 1988 the total number of births ranged between 41,800 and 45,600 annually in Alberta and between 13,400 and 14,500 in the EMRPC region.

[3]Major urban centres within the census divisions mentioned in the text are as follows: CD3 - Pincher Creek, CD6 - Calgary, CD10 - Camrose, CD11 - Edmonton, CD15 - Banff, CD17 - Peace River. For the exact boundaries of Alberta's census divisions see Map 1 in the appendix

[4]Population Projections for Canada, Provinces and Territories, 1989 - 2011, Statistics Canada, March 1990. Catalogue 91-520 'Occasional, p. 3.

TABLE 1

ACTUAL AND PROJECTED TOTAL FERTILITY RATES

ALBERTA, SELECTED YEARS, 1956 - 2016

Actual Rates			
Year		Total Fertility Rate	Percentage Decline in Pervious Five Years
1956		4.282	
1961		4.267	0.3
1966		3.066	28.1
1971		2.434	20.6
1976		2.040	16.2
1981		1.936	5.1
1986		1.901	1.8
Projected Rates			
Year	Low	Medium	High
1991	1.804	1.849	1.923
1996	1.712	1.799	1.946
2001	1.625	1.750	1.969
2006	1.542	1.702	1.993
2011	1.463	1.655	2.016
2016	1.389	1.610	2.040

Note: Total fertility rates are the sum of age-specific fertility rates defined as the number of births per woman of a specific age group within the childbearing age 15-49.

Source: Population Projections Alberta 1987- 2016, Alberta Bureau of Statistics, May 1988, Table 3, page 18.

TABLE 2

ACTUAL AND PROJECTED TOTAL FERTILITY RATES, SELECTED YEARS, SELECTED ALBERTA CENSUS DIVISIONS, 1986 - 2001

CD	1986		1991	1996	2001
3	2,838	L	2,691	2,552	2,420
		M	2,761	2,685	2,612
		H	2,860	2,883	2,905
6	1,720	L	1,631	1,547	1,466
		M	1,673	1,627	1,583
		H	1,733	1,747	1,761
10	1,634	L	1,550	1,469	1,393
		M	1,590	1,546	1,504
		H	1,647	1,660	1,673
11	1,847	L	1,751	1,660	1,574
		M	1,796	1,747	1,699
		H	1,861	1,876	1,890
15	1,601	L	1,518	1,439	1,365
		M	1,557	1,514	1,473
		H	1,613	1,626	1,638
17	2,902	L	2,752	2,610	2,475
		M	2,823	2,746	2,671
		H	2,925	2,948	2,971

Notes: Total fertility rate is defined as births per one thousand women 15-49 years; L, M and H stand for low, medium and high assumptions.

Source: Population Projections, Alberta Census Divisions, 1987 - 2001, Alberta Bureau of Statistics, October 1988 Table 5, page 16.

Given the aforementioned uncertainty with respect to the direction of future fertility changes the following three assumptions have been selected for the projection purposes for the Edmonton region:

Low assumption: The total fertility rate in the Region will stay at the 1986 level of 1.847 births per woman between 1986 and 1991 and then it will gradually decline to 1.35 births between 2006 and 2011.

Medium assumption: The total fertility rate will stay constant throughout the projection period at the 1986 level of 1.847 births per woman.

High assumption: The total fertility rate will stay at the 1986 level of 1.847 births per woman between 1986 and 1991 and then it will gradually increase to 2.1 level between 2006 and 2011.

(c) Reasons for the Assumptions

Low assumption - among the most frequent reasons for the expectation of continuing declines in fertility are the expected growing participation of women in labour force, changing marriage and family arrangements (more common-law unions and more divorces) as well as an increased use of a variety of birth control methods which may tend to further reduce unwanted pregnancies. It may be interesting to note that the Region's fertility rate of 1.35 to be in effect under this assumption between the years 2006 and 2011 is above Quebec City metropolitan area's fertility rate of 1.24 recorded in 1986. In the same year Montreal metropolitan area's fertility was 1.37, Ottawa's 1.46 and Victoria's 1.44. (see Table 3).

Medium assumption - the most recent trends in fertility in a number of industrialized countries show that declines in fertility have been significantly slowing down. This has been also true of both Alberta and Canada. Some Canadian provinces (Ontario, Manitoba and British Columbia) have even recorded slight fertility rate increases between 1981 and 1986 (See Table 4). These developments suggest that the social and economic changes, which for decades have been pushing fertility rates in Canada down, might have lost their momentum and that fertility may stabilize around the existing level in the future.

High assumption - since fertility has been declining in Canada and Alberta for more than 30 years much of the discussion of demographers about the future fertility trends has focused on whether fertility will continue to fall or will stabilize at the present level. Although demographers generally do not expect another high fertility period typical of the post-war baby-boom, there are recent indications in Canada of slight upward fertility changes. This kind of development occurred not only in relatively small Manitoba - an increase from 1.86 to 1.89 between 1981 and 1986 - but also in more populous provinces such as Ontario (from 1.63 to 1.69) and British Columbia (from 1.71 to 1.72). (See Table 4). As some analysts claim the present low level of fertility might have been caused partially by a postponement of births by career oriented women and as these births may eventually be made up fertility may eventually increase. Additionally, institutional and economic arrangements could be found to ease the work pressure on career women (e.g. flex time, part time, work sharing arrangements, better daycare and household services) which could make it easier for women to pursue both motherhood and employment. Pronatalist policies along the lines of the measures implemented by the government of Quebec or some Eastern European countries (special financial contributions to the families having more children) could also stimulate a rise in fertility in the future. Another factor, which may be important for Canada as well as Alberta, is the fact, that fertility rates of foreign-born women tend to be higher than those of Canadian-born women. As a result, increased international migration can be expected to stimulate an increase in fertility in the Region.

TABLE 3

TOTAL FERTILITY RATE, SELECTED COUNTRIES AND REGIONS, SELECTED YEARS 1970 TO 1986

Countries and Regions	1970	1975	1980	1986
Canada	2.19 (1971)	1.83 (1976)	1.75	1.67
Quebec	1.89*	1.58*	1.52	1.24
Montreal	1.69*	1.53*	1.44	1.37
Ottawa	1.91*	1.41*	1.32	1.46
Victoria	1.55*	1.07*	1.19	1.44
Denmark	1.95	1.92	1.55	1.48
Federal Republic of Germany	1.99	1.45	1.45	1.35
Italy	2.43	2.21	1.68	1.35
North	-	1.94	1.34	1.08
Central	-	2.00	1.48	1.17
Luxembourg	1.96	1.63	1.51	1.45
The Netherlands	2.58	1.66	1.60	1.55
Norway	2.50	1.98	1.72	1.71
Sweden	1.92	1.77	1.68	1.79

(-) Data not available.
(*) Estimates.

Sources: Population Projections for Canada, Provinces and Territories 1989 - 2011, Statistics Canada, March 1990. Table 2, Page 8.

Table 4

Total Fertility Rate, Canada, Provinces and Territories, Selected Years 1971 to 2011

	CANADA	NFLD	PEI	N.S.	N.B.	QUE	ONT	MAN	SASK	ALTA	B.C.	YUKON	NWT
Observed													
1971	2.19	3.40	2.91	2.50	2.67	1.88	2.22	2.54	2.69	2.43	2.14	3.23	4.76
1976	1.83	2.37	2.14	1.88	2.07	1.77	1.77	2.02	2.30	2.04	1.72	2.02	3.18
1981	1.70	2.01	1.91	1.64	1.71	1.61	1.63	1.86	2.14	1.94	1.71	2.14	3.00
1982	1.69	1.91	1.93	1.67	1.70	1.52	1.65	1.84	2.17	1.96	1.74	2.04	3.00
1983	1.68	1.84	1.89	1.66	1.69	1.47	1.66	1.87	2.13	1.96	1.73	2.36	3.20
1984	1.69	1.77	1.89	1.63	1.65	1.46	1.69	1.86	2.11	1.92	1.76	2.25	2.99
1985	1.67	1.72	1.90	1.62	1.60	1.43	1.68	1.88	2.09	1.93	1.73	1.97	2.86
1986	1.67	1.64	1.84	1.62	1.59	1.43	1.69	1.89	2.09	1.93	1.72	2.04	3.01
Projected						**Low Assumption**							
1991	1.62	1.59	1.80	1.56	1.56	1.48	1.61	1.82	2.08	1.87	1.65	1.96	2.85
1996	1.51	1.51	1.67	1.46	1.46	1.38	1.50	1.69	1.92	1.74	1.53	1.83	2.61
2001	1.40	1.40	1.56	1.36	1.36	1.29	1.39	1.57	1.77	1.62	1.42	1.71	2.39
2006	1.30	1.30	1.45	1.27	1.27	1.21	1.29	1.46	1.63	1.51	1.31	1.60	2.18
2011	1.20	1.20	1.35	1.18	1.18	1.12	1.20	1.35	1.50	1.40	1.21	1.50	2.00
						Medium Assumption							
1991	1.67	1.63	1.85	1.60	1.60	1.52	1.66	1.88	2.12	1.93	1.70	1.99	2.92
1996	1.67	1.63	1.85	1.60	1.60	1.52	1.66	1.88	2.05	1.93	1.70	1.94	2.83
2001	1.67	1.63	1.85	1.60	1.60	1.52	1.66	1.88	1.98	1.93	1.70	1.89	2.75
2006	1.67	1.63	1.85	1.60	1.60	1.52	1.66	1.88	1.91	1.93	1.70	1.85	2.68
2011	1.67	1.63	1.85	1.60	1.60	1.52	1.66	1.88	1.85	1.93	1.70	1.80	2.60
						High Assumption							
1991	1.67	1.63	1.85	1.60	1.60	1.52	1.66	1.88	2.12	1.93	1.70	2.04	3.00
1996	1.73	1.70	1.91	1.68	1.68	1.61	1.73	1.93	2.10	1.97	1.76	2.10	3.00
2001	1.80	1.78	1.97	1.76	1.76	1.70	1.79	1.99	2.10	2.01	1.82	2.10	3.00
2006	1.94	1.93	2.03	1.92	1.92	1.89	1.94	2.04	2.10	2.06	1.95	2.10	3.00
2011	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10	3.00

Sources: Population Projections for Canada, Provinces and Territories 1989 - 2011, Statistics Canada, March 1990 Table 1, Page 6

As indicated in Table 4 Statistics Canada considers plausible both the downward and upward movements in future fertility rates. This applies to both the country as a whole and the individual provinces. With respect to Alberta, Statistics Canada expects that the decline in fertility could go as low as 1.4 births per woman in the year 2011 and the increase could go as high as 2.1 births per woman in the same year. The range for future fertility changes assumed for the Edmonton metropolitan region is slightly wider than that used by Statistics Canada for Alberta. This is because the Region has traditionally had fertility rates lower than the Province as a whole, which is likely to continue in the future.

2. MORTALITY

Mortality has been declining in Alberta in the last three decades and a slowly declining trend can be expected to continue in the future. In contrast to the past when much of the improvement in life expectancy was due to decreased infant mortality, in the future, higher life expectancy will mostly result from medical and health related advances which will affect predominantly middle and older age groups. Human longevity will likely be favourably affected by the progress in biotechnology where breakthroughs are expected in understanding of the workings of the immune system, the development of artificial internal organs, genetically engineered pharmaceuticals and in correction and treatment of gene defects. An increased emphasis on disease prevention through the adoption of proper eating habits and healthy lifestyles can also be expected to favourably affect future life expectancy.

As shown in Table 5 the Alberta Bureau of Statistics has recently developed life expectancy assumptions which indicate that male's expectation of life at birth will increase from 73.3 years in 1986 to 78.5 years in the years between 2011 and 2016. Similarly, the female life expectancy has been projected to grow in the same period from 80.3 years to 83.7 years.

The Alberta Bureau of Statistics used only one mortality assumption in their recent population projections for Alberta[5]. As the Bureau has indicated, "in testing possible alternate life expectancy assumptions, it has been found that moderate changes of a few years has not impacted greatly on the total projected population. As a result, since variations in fertility and migration have more impact, only one mortality assumption was used by the Bureau to allow for more fertility and migration assumptions...". A similar approach has been adopted in preparing the population projections for the Edmonton metropolitan region. The age specific mortality rates calculated by the Alberta Bureau of Statistics for Alberta for the period 1985 - 1987 have been used for the Region in the base year (1986). These then have been gradually reduced during the projection period to the levels resulting in a life expectancy increasing from 80.3 years (1986) to 83 years (2011) for females and from 73.3 years to 77.2 years for males. These life expectancy changes cause the difference between female and male life expectancy to decline from 9.5 percent in 1986 to 7.5 percent at the end of the projection period.

3. MIGRATION

(a) Alberta

(i) Past Migration Trends

Migration has been an important but widely fluctuating component of population growth for both Alberta and the Edmonton metropolitan region. Total migration to Alberta consists of net international and net interprovincial migration. Information about these migration components is shown in Table 6.

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[5]Population Projections, Alberta, 1987-2016, Alberta Bureau of Statistics, May 1988.

TABLE 5

ACTUAL AND PROJECTED EXPECTATION OF LIFE, ALBERTA, SELECTED YEARS, 1956 - 2016

Actual			
Year	**Male**	**Female**	**% Difference between Female & Male**
1956	68.94	74.38	7.9
1961	69.57	75.55	8.6
1966	70.10	76.23	8.7
1971	70.44	77.38	9.9
1976	71.04	78.24	10.1
1981	71.98	79.09	9.9
1986	73.30	80.30	9.5
Projected			
1991-1996	74.4	81.1	9.0
1996-2001	75.2	81.8	8.8
2001-2006	76.1	82.2	8.0
2006-2011	77.2	83.0	7.5
2011-2016	78.5	83.7	6.6

Source: Population Projections, Alberta, 1987-2016, Alberta Bureau of Statistics, May 1988, Table 2, page 16.

As can be seen from the table, Alberta's net international migration has generally been positive in the time between 1956 and 1989. It fluctuated throughout the period between a maximum loss of 1,500 people in 1964 and a maximum gain of 15,000 people in 1957. In the last ten years (1980-1989) net international migration ranged between 3,000 (in 1987) and 13,300 people (1981). Net international migration was negative only in the short period between 1962 and 1965 when the net yearly population loss for Alberta from emigration ranged between 600 and 1,500 people.

Net interprovincial migration to Alberta has fluctuated in the period under review much more widely than net international migration. In the two decade time span between 1956 and 1974,it was generally positive with a level not exceeding 9,000 people. Net population losses due to interprovincial migration occurred in this period only in 1957 (1,500 people) and then in the short (four year) time span between 1964 and 1967 (between 400 and 9,400 people).

Net interprovincial migration to Alberta increased significantly in the development boom period between 1975 and 1982. In this eight year time span interprovincial migration has brought to Alberta between 27,200 and 55,100 additional residents annually. This situation changed drastically at the beginning of 1983 when Alberta suffered serious economic difficulties and a period of substantial population losses due to outmigration to other provinces began. These losses ranged between 2,600 (1989) and 35,400 (1984) people annually in the seven year period from 1983 to 1989. With a recent economic recovery Alberta's population losses due to interprovincial migration declined and in 1990 the Province experienced a slight population gain from interprovincial migration,[6] for the first time since 1983.

Alberta's total net migration levels have changed in the period under review generally parallel to the changes in interprovincial migration. International migration which has generally been more stable has tended to accentuate the upward swings and moderate the downward swings in interprovincial migration. As a result we can see several distinct migration periods as follows:

(1) a period of low and/or negative net migration ranging between minus 7,800 and plus 7,500 people in the period between 1962 and 1967;

(2) two periods of medium net migration ranging between 10,600 and 14,700 people in the time span between 1957 and 1961 and again between 1968 and 1974;

(3) a period of high net migration in the eight year period between 1975 and 1982 when net migration to Alberta ranged between 36,800 (1975) and 68,300 (1981);

(4) a period of substantial net outmigration ranging between 4,100 and 32,600 people between 1983 and 1988; and

(5) recently renewed net in-migration (5,300 people in 1989)

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[6]It may be interesting to note in this context the following extract from the Oct 2, 1990 press release of the Alberta Bureau of Statistics; "In both quarters (first and second of 1990) Alberta gained 1,000 people from other provinces. Alberta's population also grew through migration from other countries. Net international migration doubled in the second quarter to reach almost 4,300, the highest quarterly level for the past ten years."

TABLE 6

INTERPROVINCIAL AND INTERNATIONAL MIGRATION, ALBERTA, 1956 - 1989
(IN THOUSANDS)

Year	INTERNATIONAL			INTERPROVINCIAL			TOTAL
	IMMIGRATION	EMIGRATION	NET	IN	OUT	NET	
1956	7.9	4.6	3.3	39.8	37.8	2.0	5.3
1957	17.4	2.4	15.0	44.7	46.2	-1.5	13.5
1958	14.3	2.5	11.8	46.6	44.4	2.1	13.9
1959	7.8	2.1	5.7	44.1	36.6	7.5	13.3
1960	7.3	2.6	4.7	44.8	36.6	8.2	12.9
1961	5.7	2.6	3.1	45.6	37.7	7.9	11.0
1962	4.8	5.4	-0.6	45.7	37.6	8.1	7.5
1963	4.6	5.9	-1.2	47.2	41.7	5.5	4.3
1964	5.0	6.4	-1.5	45.0	45.4	-0.4	-1.9
1965	6.3	7.1	-0.8	45.0	49.7	-4.6	-5.5
1966	8.7	7.2	1.6	47.7	57.1	-9.4	-7.8
1967	12.1	6.2	5.9	55.5	55.9	-0.5	5.5
1968	14.2	6.5	7.7	55.3	49.6	5.7	13.4
1969	12.4	4.5	7.9	54.0	47.2	6.8	14.7
1970	11.5	3.7	7.8	62.2	55.3	6.9	14.7
1971	9.8	3.1	6.7	58.3	53.8	4.6	11.2
1972	8.2	4.9	3.4	63.0	55.8	7.2	10.6
1973	9.0	4.6	4.4	64.5	55.5	9.0	13.4
1974	13.4	6.2	7.2	74.7	67.2	7.5	14.7
1975	15.4	5.8	9.6	82.2	55.0	27.2	36.8
1976	15.7	4.8	10.8	77.9	49.9	27.9	38.8
1977	13.9	7.1	6.8	86.8	41.2	45.5	52.4
1978	12.1	7.9	4.2	88.7	45.3	43.3	47.5
1979	8.9	7.5	1.4	91.4	47.3	44.2	45.6
1980	16.1	6.0	10.1	108.1	53.9	52.2	62.3
1981	18.8	5.6	13.3	114.8	59.7	55.1	68.3
1982	20.6	7.4	13.2	98.0	64.8	33.3	46.5
1983	14.5	7.9	6.6	57.9	72.9	-15.1	-8.5
1984	10.6	7.8	2.8	39.9	75.3	-35.4	-32.6
1985	9.5	5.4	4.1	64.5	89.8	-25.2	-21.1
1986	10.2	6.6	3.6	74.2	81.8	-7.7	-4.1
1987	10.4	7.4	3.0	48.2	78.5	-30.3	-27.3
1988	12.6	6.3	6.3	47.5	70.7	-23.2	-16.9
1989	13.8	5.9	7.9	68.9	71.5	-2.6	5.3

Notes: Migration data are for census years - June 1 reference date.

Source: Population Projections Alberta, 1987-2016, Alberta Bureau of Statistics, May 1988 Table 5A, page 23. Data for the period 1986-1989 are from Alberta Population growth, Fourth Quarter, 1989, Alberta Bureau of Statistics, July 1990, Table 5, page 12.

(ii) Projected Migration Levels

Future prospects for net migration to Alberta have recently been evaluated by the Alberta Bureau of Statistics[7] for the period 1987 - 2016.

As indicated in Table 7 the Alberta Bureau of Statistics projects "low" levels of migration to range annually in the 1991 - 2011 period between 1,840 and 9,000, "medium" between 8,060 and 17,780 and "high" between 16,600 and 24,500. It is recognized by ABS that "because of the sensitivity of migration to economic conditions the migration flows will fluctuate up and down and that the future information needed to accurately predict such short-term cyclical behaviour is unfortunately not available."

(b) Edmonton Metropolitan Region

(i) Past Migration Trends

Net migration to the Edmonton metropolitan region has generally been changing in recent years in parallel with that of Alberta. It amounted to 41,600 people between 1971 and 1976, it increased substantially to 78,400 people in the 1976-1981 economic boom period and then it involved a net loss of 7,200 people between 1981 and 1986. Based on civic census information the population losses due to outmigration continued in the three years between 1986 and 1989 when the Region's total population growth was only 16,340 people compared to an estimated natural increase of over 29,000. A strong positive migration to the Region has been renewed, however, in 1990 when the Region's population grew by approximately 26,000 people.[8] It is estimated (by the author) that the total net migration to the Region will amount in the whole 1986-1991 period to approximately 7,500 people.

(ii) Future Migration Assumptions

Net migration to Alberta consists of net international and net inter-provincial migration. The size of international migration to Alberta depends on the number of immigrants who are allowed into Canada (federal immigration policies) and on the state of the Alberta economy relative to that of other provinces. Net inter-provincial migration has been determined nearly exclusively by the economic factors such as inter-provincial differences in unemployment rates, cost of living and earnings. In 1988 the Alberta Bureau of Statistics prepared population projections for Alberta's 19 census divisions for the period 1987-2001[9]. Historically, the Region has contained approximately 94 percent of CD 11's total population. The ABS projection for CD 11 is based on the assumption that CD 11's future population will form a slightly declining proportion of Alberta's future population. This assumption is reflected in the expected migration levels for CD 11 as shown for selected years in Table 8.

As can be inferred from the table the Region's migration levels could range between -1,222 and 3,816 in the year 1991 and between 2,444 and 6,420 in the year 2001.

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[7]Population Projections, Alberta 1987-2016, Alberta Bureau of Statistics, May 1988.

[8]The majority of the Region's population growth (21,666) has been concentrated in the City of Edmonton. As indicated by Edmonton's officials the 1990 reported population growth might have been exaggerated as a result of civic census underreporting in the previous years.

[9]Population Projections, Alberta Census Divisions, 1987 - 2001, Alberta Bureau of Statistics, October 1988.

In the last several years the City of Edmonton has been preparing annual population projections updates. The most recent projection set for the period 1989-2003 assumes net average migration to the City of Edmonton to amount to 3,664 people annually between 1990 and 2003. If the City retained 75 percent of the Region's population, the average migration to the Region implied by this assumption would be approximately 4,900 people annually.

In the ten year period between 1976 and 1986, which included a variety of migration levels ranging from high net in-migration to net outmigration, the average annual net migration to the Region amounted to approximately 7,100 people. In the five year period between 1976 and 1981, the average net migration to the Region was equal to 15,670 people per year.

Based on the evaluation of past migration trends and future economic prospects for the Region as well as information from other relevant studies, the following three migration levels summarized in Table 9 were determined to represent a reasonable range for population projections for the period 1986 - 2011.

The 1986 - 1991 average annual migration level of 1,500 has been estimated on the basis of the 1986-1990 actual data and an assumed net migration figure of 5,500 for 1991. Given the significant growth in 1990, this assumption seems to be realistic even though the net migration flow to the region was negative for the previous three years.

The low migration assumption of 1,800 annually adopted for the 1991-2011 period, is slightly higher than the 1986-1991 estimated level and corresponds to 27.8 percent of the "low" average annual migration figure projected by ABS for the 1991-2011 period for Alberta.[10] This migration level implies that the Region would grow slightly slower than Alberta as it presently contains approximately 32 percent of Alberta's population. The low migration assumption would correspond to the state of the Alberta economy characterised by its gradual diversification accompanied by unemployment rate typical of the past five years - ranging between 6 and 10 percent. Only a few of the major resource projects planned for Alberta in the next ten years would be implemented under this migration scenario (see the list of Alberta's planned resource projects in Appendix, Table 3).

The high projected annual migration of 7,100 corresponds to the Region's average migration level for the 1976-1986 period. It amounts to 45.3 percent of the average net migration level achieved by the Region in the high growth period between 1976 and 1981 and it equals 33.1 percent of Alberta's average "high" net migration projected for the period between 1991 and 2011. Given the fact that the Region presently contains approximately 32 percent of Alberta's population, this assumption implies that the Region could grow slightly faster than Alberta under the high growth scenario. This migration assumption would likely correspond in the medium run to the state of the Alberta economy characterized by the process of gradual diversification accompanied by the implementation of the majority of the large resource projects planned for Alberta in the next ten years.

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[10]The reader should be reminded in this context that the Region's projections have been prepared assuming that the three assumed average migration levels will remain constant in the projection period between 1991 and 2006. ABS on the other hand assumed rising annual net migration levels for each of its (low, medium, high) migration assumption sets. ABS's projected "low" annual migration keeps therefore growing after the year 2011.

TABLE 7

PROJECTED TOTAL NET MIGRATION, ALBERTA, 1991-2006

	1991-1996		1996-2001		2001-2006		2006-2011	
	Average Annual	Total	Average Annual	Total	Average Annual	Total	Average Annual	Total
Low	1,840	9,200	6,580	32,900	8,440	42,200	9,000	45,000
Medium	8,060	40,300	14,340	71,700	16,520	82,600	17,780	88,900
High	16,600	83,000	21,800	109,000	22,820	114,100	24,500	122,500

Source: Population Projections, Alberta, 1987-2016, Alberta Bureau of Statistics May 1988, Table 5B, p. 24.

TABLE 8

ASSUMED NET MIGRATION FOR CENSUS DIVISION 11 AND EDMONTON METROPOLITAN REGION, SELECTED YEARS, 1987-2001

	1987		1991	1996	2001
CD11		Low	-1,300	1,560	2,600
	-7,930	Medium	810	3,280	4,910
		High	4,060	6,210	6,830
EMRPC					
Region*		Low	-1,222	1,466	2,444
	-7,454	Medium	761	3,083	4,615
		High	3,816	5,837	6,420

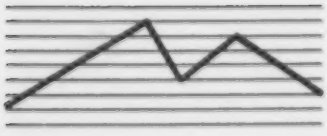
Note: The Region's figures were calculated to represent 94 percent of CD 11's assumed migration levels.

Source: Population Projections, Alberta Census Divisions, 1987-2001, Alberta Bureau of Statistics, October 1988, Table 4, p. 15.

TABLE 9

ASSUMED NET MIGRATION LEVELS EDMONTON METROPOLITAN REGION, 1986-2011

	1986-1991		1991-2011	
	Total	Average Annual	Total	Average Annual
Low	7,500	1,500	36,000	1,800
Medium	7,500	1,500	89,500	4,450
High	7,500	1,500	142,000	7,100



iv. projection scenarios

v. projection results

The selected "medium" projected annual migration level of 4,450 falls in the middle of the "low" - "high" projected average migration range.

IV. PROJECTION SCENARIOS

All possible combinations of one mortality assumption (declining), three fertility assumptions (declining, constant, rising) and three net migration assumptions (low, medium, high) have been used to produce the following nine projection scenarios:

Scenario I -- declining fertility, low migration
Scenario II -- declining fertility, medium migration
Scenario III -- declining fertility, high migration
Scenario IV -- constant fertility, low migration
Scenario V -- constant fertility, medium migration
Scenario VI -- constant fertility, high migration
Scenario VII -- rising fertility, low migration
Scenario VIII -- rising fertility, medium migration
Scenario IX -- rising fertility, high migration

As the foregoing discussion indicates, all the scenarios fall within a plausible range of growth possibilities based on the analysis of past and emerging demographic trends. The purpose of experimenting with all nine scenarios and preparing corresponding population projections (summarized in Appendix, Table 1), was to examine the growth results of a reasonably wide range of plausible assumptions.

V. PROJECTION RESULTS

1. General

A subset of three population projections (from a total of nine) has been selected for a detailed discussion in this report. Projection I - Low (Scenario I) and Projection III - High (Scenario IX) reflect the assumption combinations determining the low and high ends of the projections range. Projection II - Medium (Scenario V) is expected to represent the most likely course of future events in the long run.

The results of the three selected projections are summarized in Table 10. They represent low growth, medium growth and high growth scenarios. The assumptions about mortality are the same for all the projections: life expectancy at birth increases from 80.3 years in 1986 to 83 years in 2011 for females and from 73.3 to 77.2 years for males. The fertility rate is held constant for all the projections between 1986 and 1991 at the 1986 level of 1.847 births per woman. Net migration is also assumed to be the same for all the projections in the first five years of the projection period (1986 - 1991) at the average level of 1,500 per year. For the 1991-2011 period the projection assumptions are as follows:

The low growth Projection I assumes a gradually declining fertility rate from the assumed 1991 level of 1.847 to the level of 1.35 to be in effect between 2006 and 2011. Net migration is assumed under this projection to be at an annual level of 1,800 people throughout the rest of the projection period.

Figure 1

Population Projections
EMRPC Region, 1986-2011

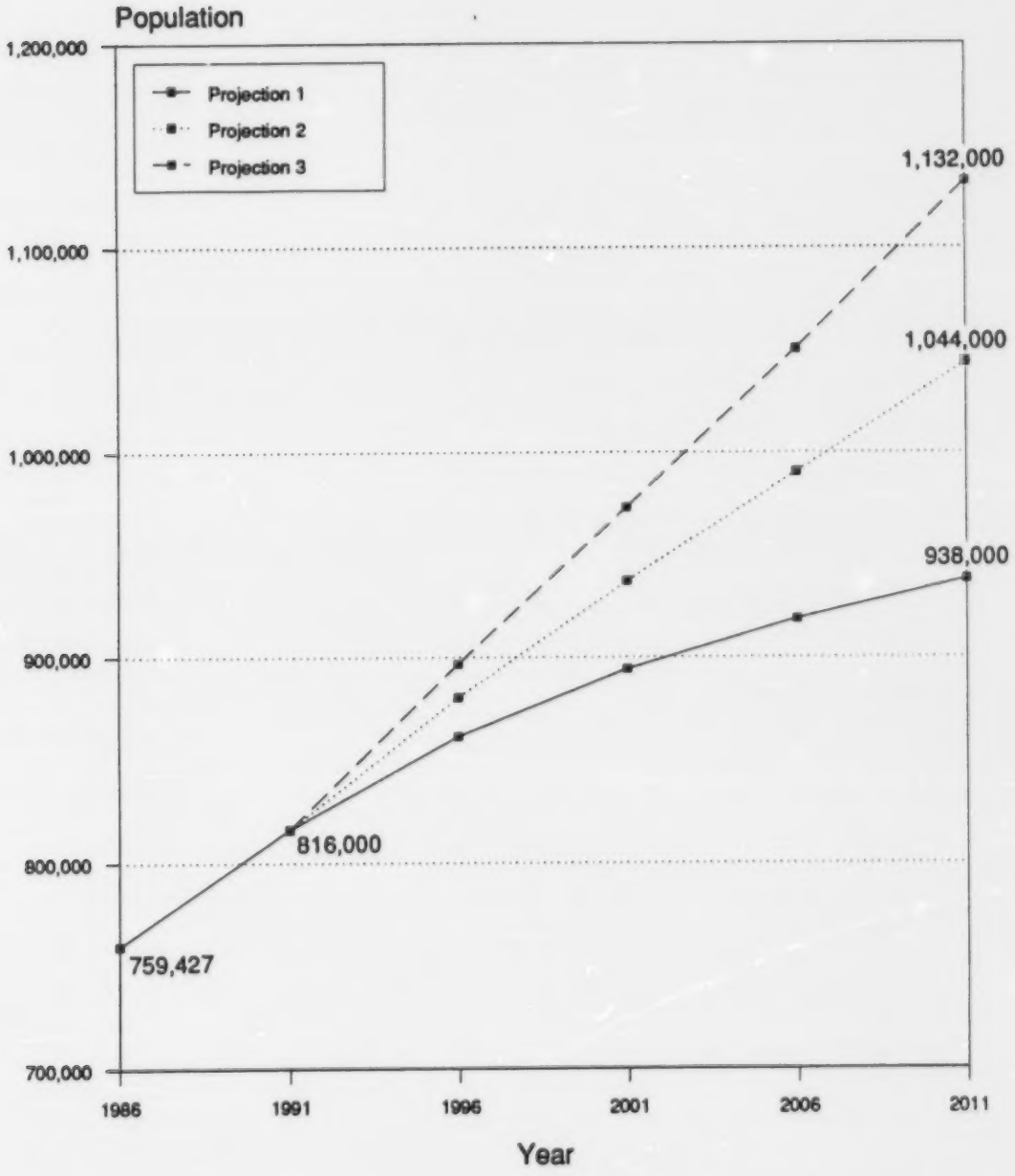


TABLE 10

POPULATION PROJECTIONS, EDMONTON METROPOLITAN REGION, 1986 - 2011

PROJECTIONS	1986	1991	1996	2001	2006	2011	
I Low	759,427	816,230	861,420	894,030	918,420	937,680	
II Medium	759,427	816,230	880,270	936,950	990,390	1,044,010	
III High	759,427	816,230	896,480	973,110	1,050,460	1,132,300	
INCREMENTS	1986-1991	1991-1996	1996-2001	2001-2006	2006-2011	1986-2011	1991-2011
- Low	56,803	45,190	32,610	24,390	19,260	178,253	121,450
% of Alta		45.1	33.4	25.0	19.4		30.8
- Medium	56,803	64,040	56,680	53,440	53,620	284,580	227,780
% of Alta		45.0	36.6	32.8	30.6		35.8
- High	56,803	80,250	76,630	77,350	81.840	372,870	316,070
% of Alta		39.6	34.7	33.2	31.5		34.5
Average Annual Growth	1986-1991	1991-1996	1996-2001	2001-2006	2006-2011	1986-2011	1991-2011
- Low	11,361	9,038	6,522	4,878	3,852	7,130	6,073
- Medium	11,361	12,808	11,336	10,688	10.724	11,383	11,389
- High	11,361	16,050	15,326	15,470	16,368	14,915	15,804
Average Annual Growth Rate							
- Low	1.45	1.08	0.75	0.54	0.42	0.85	
- Medium	1.45	1.52	1.25	1.12	1.06	1.28	
- High	1.45	1.89	1.65	1.54	1.51	1.61	

The high growth Projection III is based on the assumption of gradually increasing total fertility rate from the assumed 1991 level of 1.847 to the 2.1 level to be in effect between 2006 and 2011. Net migration is assumed under this projection to be at an annual level of 7,100 people between 1991 and 2011. At this level, net migration will contribute 45 percent of the growth, occurring in the twenty year period between 1991 and 2011 compared to only 30 percent under Projection I and 39 percent under Projection II.

The medium growth Projection II represents the most likely course of future events. It is based on the assumption of the fertility rate of 1.847 births per woman held constant throughout the projection period. Net migration is assumed to equal 4,450 people per year between 1991 and 2011. This migration figure falls in the middle of the "low" - "high" projected net migration range (1,800 - 7,100).

As shown in Table 10 the Region's population is projected to increase in the twenty five year projection period from the 1986 level of 759,427 people to between 937,700 (Projection I) and 1,132,300 (Projection III) in the year 2011. This represents a population increase of between 178,200 and 372,900. The medium Projection II increment of 284,600 people would bring the Region's population to 1,044,000 in the year 2011. This increment represents 79.5 percent of the Region's growth achieved in the past twenty four year period between 1966 and 1990. Projection III's increment of 373,000 slightly exceeds (by 15,000) the 1966-1990 growth.

Distributed evenly throughout the projection period the amount of growth under Projection II would be equal to an average annual increment of 11,380 people. This is nearly identical to the growth anticipated to have occurred in the Region in the recent period between 1986 and 1991. Based on the low and high projections the annual population increase would range between 7,130 and 14,910 people in the whole 1986 - 2001 projection period and between 6,070 and 15,800 in the twenty year time span between 1991 and 2011. It may be noted for comparison purposes that in the fifteen year period between 1971 and 1986 the Region's population grew on average by 15,980 people annually, which is very similar to the projected growth under Projection III in the twenty year period between 1991 and 2011. In the high growth period between 1976 and 1981 this average amounted to 23,900 people. On the other hand, in the slow growth period between 1981 and 1986, when the Region lost over 7,000 people to net outmigration, the average annual increment amounted to only 8,780 people.

The projected average annual rates of growth have a generally declining tendency starting in 1996. They range between 0.85 percent (Projection I) and 1.61 percent (Projection III) for the whole projection period. The medium projection (Projection II) implies a 1.28 percent average annual rate of growth throughout the projection period. In the twenty five year period between 1961 and 1986 the Region's population grew at a 2.83 percent average annual rate. In that time span the slowest rate was recorded in the five year period between 1981 and 1986 at 1.2 percent annually.

The fact that the fertility rate in the Region is presently below the population replacement level sometimes creates an impression that without net migration the Region's population would soon start to decline. This would happen, but not immediately. Computer simulations indicate that because the Region presently has a relatively young population (low crude death rates) with strong age groups of women in childbearing ages, it would take the Region under the current fertility rate (with mortality declining to the year 2011 and then constant) approximately 40 years before it would stop growing. At that time (2026) it would have approximately 958,00 people which is 156,000 more than presently.

Even with the fertility rate dropping along the lines of Projection I (declining to 1.35 in the year 2011 and remaining constant thereafter) and with no migration, the Region's population would not stop growing until after 30 years and it would by then be 86,000 larger than presently. At that time (2016) the total number of births would be offset by the total number of deaths. Under these circumstances crude death rate would increase considerably in the 30 year time span from the 1986 level of 5 to 8.9 deaths per 1,000 population annually. The decline in population would start in the year 2017 and it would escalate from 4,000 in the first five years to 13,800 in the second, and so on. In a 20 year period the population would decline in total by slightly over 73,000.

If the fertility rate in the Region underwent the changes envisioned under Projection III -- increasing to the replacement level of 2.1 between 2006 and 2011 and remaining at that level thereafter -- the Region's population would continue growing without any net migration for the next 55 years. It would reach its maximum of 1,009,000 in the year 2041 and it would stabilize at around one million shortly thereafter. At that time the Region would have approximately 12,500 births annually balanced by a similar number of deaths.

If the population changes in the Region developed along the scenario of Projection I extended into the future (fertility rate declining to 1.35 in the year 2006 and constant at that level thereafter, 1,800 net annual migration) the Region's population would continue growing for approximately 33 years. At the end of that period (year 2019) births would be equal to deaths at around 9,000. In the years to follow migration would no longer be able to compensate for the excess of deaths over births and the population would start to diminish. In 72 years (the year 2058) its size would be again equal to the present one.

2. Projected Age Composition Changes

All three projections bring home the same basic message about the future -- the Region's population will grow at a slower rate than in the past and its aging process will accelerate. The slowest aging process can be expected under the high growth Projection III as the assumed rising fertility and high migration will continue adding to the Region's population large numbers of people in the younger age groups. Still, the median age in the Region is projected to increase under this scenario from the 1986 level of 29 years to 34 years at the end of the projection period. Under the slow and medium growth scenarios of Projections I and II, the median age will increase significantly faster -- it will reach 40 years and 36 years by the year 2011, respectively. These important shifts in the median age of the Region's population will result from a variety of factors -- the aging of the baby-boom groups, relatively fewer births as well as increasing longevity of the population. As indicated earlier, longevity is assumed to rise under all the scenarios, during the projection period, from 73.3 to 77.2 years for males and from 80.3 to 83 years for females.

Despite the projected medium age increases, the Region's projected population will still remain relatively young compared to the rest of the country. It may be useful to note in this context that Canada's median age is already now 33 and it has recently been projected to increase under medium growth assumptions to 41 years by the year 2011.[11]

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[11]Population Projections for Canada. Provinces and Territories, 1989 - 2011, Statistics Canada, March 1990.

As can be seen in Table 11 the relative size of the young (aged 0-17) and retired (aged 65+) segments of the Region's population can be expected to develop in the future in generally opposite directions. At the beginning of the projection period (1986) the proportion of people 65 years-and-over constituted 7.3 percent of the Region's population. Under the optimistic assumption of rising fertility and high migration (Projection III), this percentage is projected to rise to 11.3 percent while the proportion of the young is to decline under the same assumptions from 27.2 to 24.6 percent. Much larger age composition changes can be expected to occur under the assumptions of declining fertility and low migration of Projection I. Under this scenario the elderly's share of the Region's population would nearly double (an increase from 7.3 to 13.5 percent) and that of the young would show a significantly sharper decline (from 27.2 to 18.7 percent). The most dramatic decrease would occur in the group of children of preschool age (0-4), the share of which would drop from 8.4 percent in 1986 to 4.6 percent in 2011. Under this scenario the whole age group 0-17 would after, an initial increase, also decline in absolute terms - from 207,000 in 1986 to 175,000 in 2011. In absolute terms the declining fertility scenario of Projection I would again most significantly affect the preschool age group of children (0-4) whose numbers would, despite a brief initial increase, decline in the projection period by 32.9 percent (from 64,000 to 43,000). The school age population (5-17) would also initially increase (from 142,000 in 1986 to 169,000 in 2001) and then decline to 132,000 in the year 2011.

Under the constant and rising fertility scenarios of Projections II and III, the school age group (5-17) would not drop in absolute terms. On the contrary its numbers would rise in the projection period by 18.8 and 37.6 percent, respectively. (from 142,00 to 170,000 and 197,000 respectively) The proportion of this age group in the total population would, however, decline from 18.8 percent in 1986 to 16.3 and 17.4 percent in the year 2011, respectively. At the same time the preschool age group of children would increase in absolute terms from 64,000 to 66,000 and 82,000 respectively, while its proportion would drop from 8.4 percent to 6.3 and 7.2 percent.

The group of young adults (18-24) also deserves special attention in this review of future age composition changes. It is an age group of the young adults, the majority of whom enter the labour market for the first time and/or seek an entry in a college, university or other post-secondary educational institution. Their age also predisposes these young adults to start considering establishing their own households and/or families for the first time.

Under the assumptions of the medium and high growth Projections II and III, the number of people aged 18 to 24 would, after an initial decline, (from 101,000 in 1986 to 81,000 in 1991) increase in the Region to 108,000 and 118,000, respectively, at the end of the projection period. Under the declining fertility-low migration scenario of Projection I, the number of people in this age group can be expected to decline to 97,000 at the end of the projection period. Under all three projections, the 18-24 age group will increase by a smaller percentage than the broader working age group aged 18-64 and as a result its representation in the working age population will decline from 20.3 percent in 1986 to between 15.3 and 16.3 percent in the year 2011. The young adult age group's relative importance in the Region's total population can be expected to diminish between 1986 and 1996. Its share of the total population is projected to decline in this period from 13.3 % to between 9.1 % and 9.6% and then to increase under all three projections to 10.4 percent in the year 2011.

Figure 2

Projection I-Population Distribution by Age Group, EMRPC Region, 1986-2011

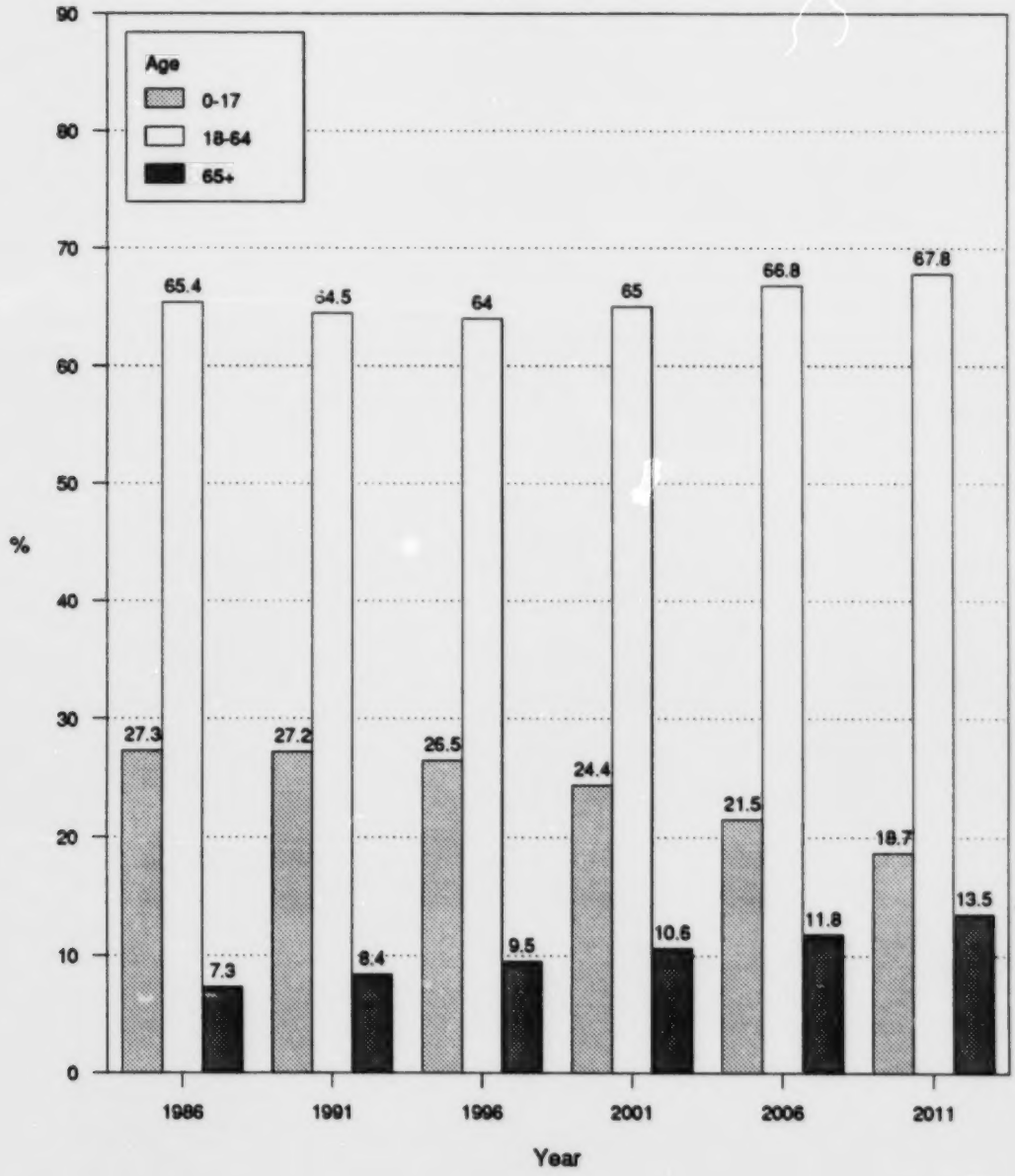

Figure 3

Projection II-Population Distribution by Age Group, EMRPC Region, 1986-2011

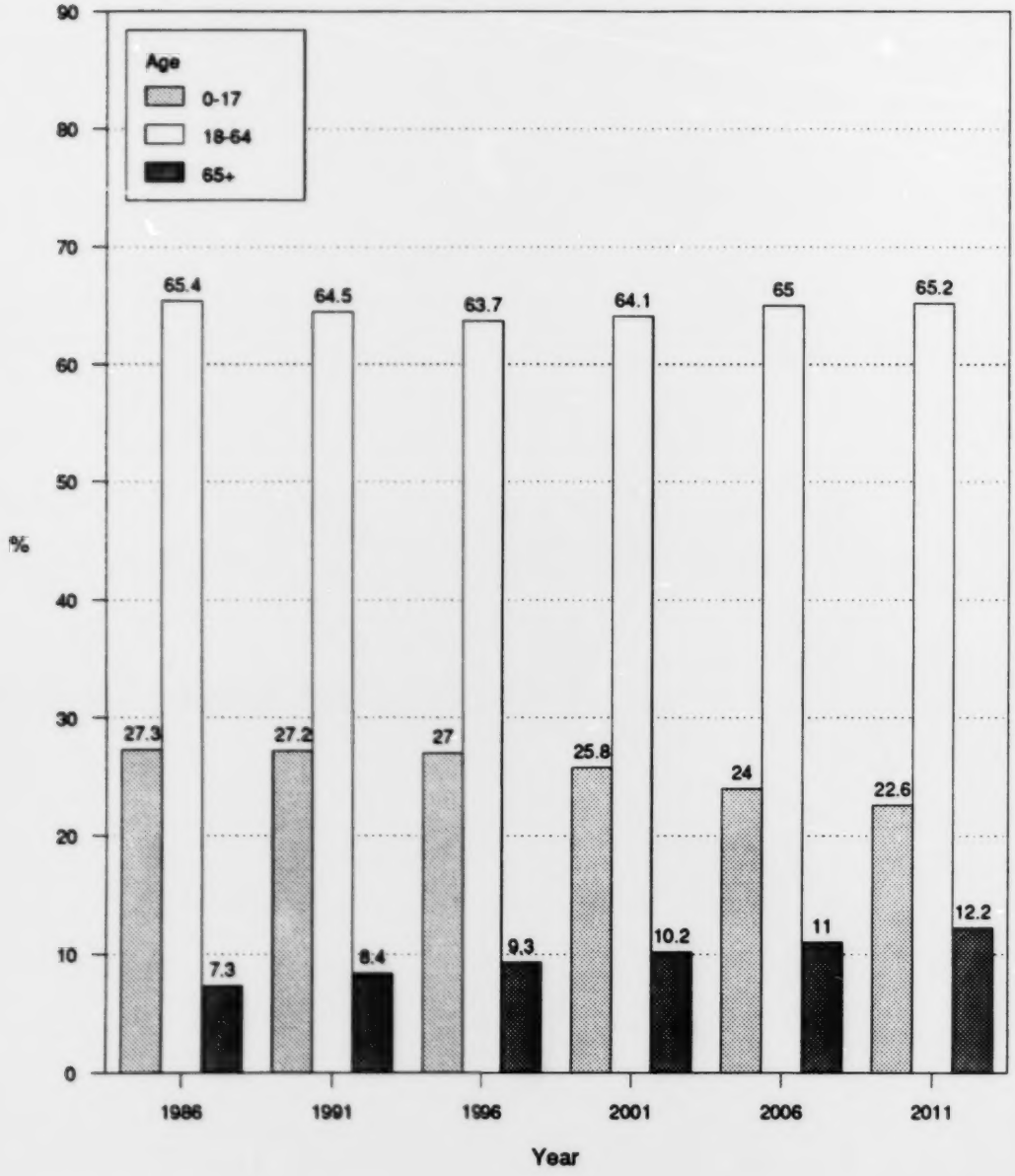

Figure 4

Projection III-Population Distribution by Age Group, EMRPC Region, 1986-2011

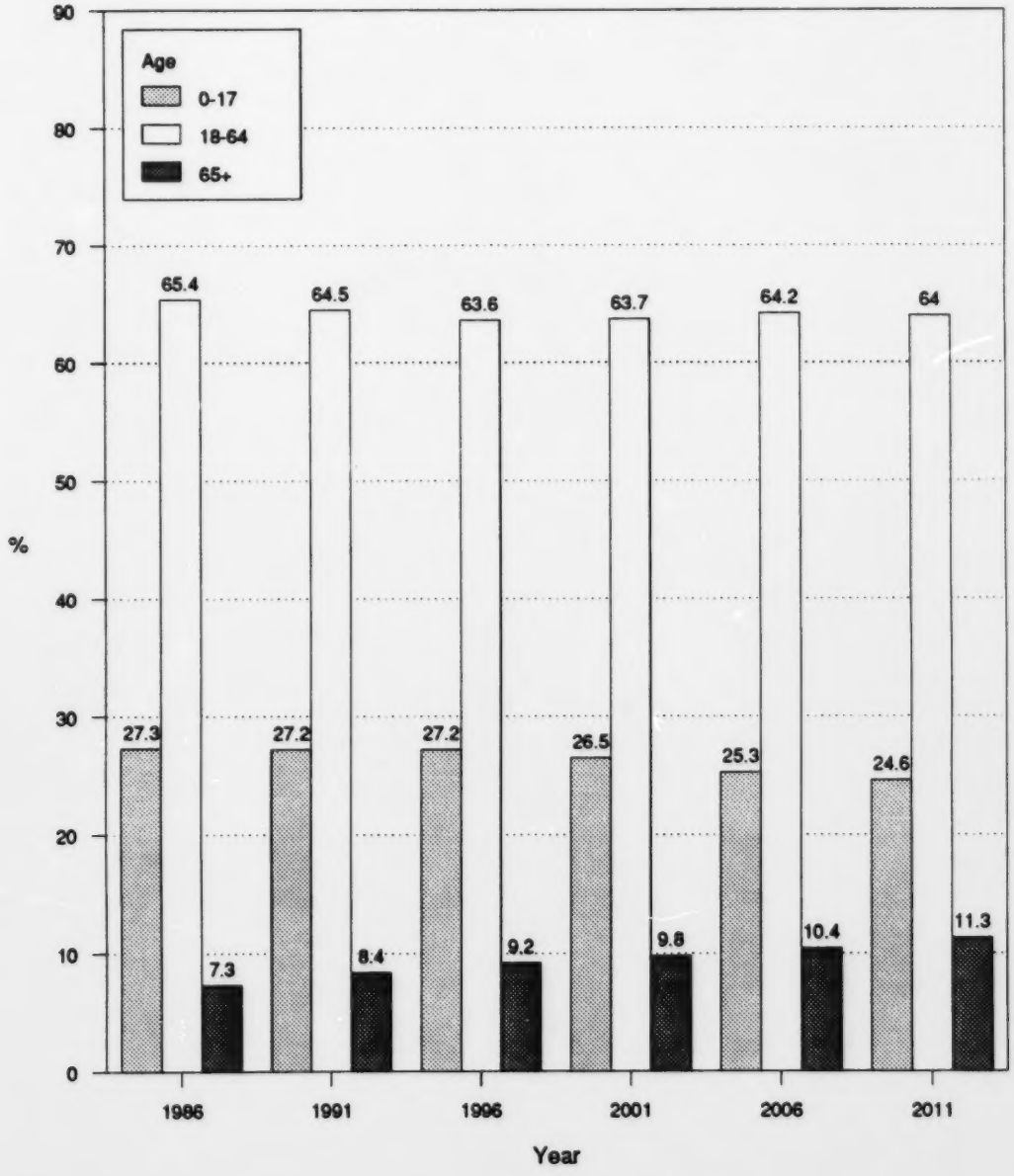

TABLE 11

PROJECTED AGE DISTRIBUTION OF THE POPULATION IN THE EDMONTON REGION, SELECTED AGE GROUPS, LOW, MEDIUM, HIGH PROJECTIONS, 1986 - 2011

AGE GROUP			LOW		MEDIUM		HIGH	
	1986		2011		2011		2011	
		%		%		%		%
0-4	64,100	8.4	43,000	4.6	65,500	6.3	81,800	7.2
5-17	142,500	18.8	132,300	14.1	170,200	16.3	197,200	17.4
0-17	206,600	27.2	175,400	18.7	235,700	22.6	279,000	24.6
18-24	100,900	13.3	97,200	10.4	108,100	10.4	117,900	10.4
18-64	497,300	65.5	635,900	67.8	680,900	65.2	724,900	64.0
65-74	34,200	4.5	69,000	7.4	69,600	6.7	70,200	6.2
75+	21,400	2.8	57,400	6.1	57,800	5.5	58,200	5.1
65+	55,600	7.3	126,400	13.5	127,400	12.2	128,400	11.3
TOTAL	759,400	100.0	937,700	100.0	1,044,000	100.0	1,132,300	100.0

The broad working age group (18-64), the large majority of which was already born at the beginning of the projection period, will be only marginally affected by the assumed shifts in fertility. Its number will change mainly depending on the size of net migration, mortality and the size of the younger cohorts shifting over time into this age category. In absolute terms this age group stood at 497,000 in 1986 and is projected to increase by between 28 and 46 percent to between 636,000 (Projection I) and 725,000 (Projection III) by the year 2011. In terms of its proportion of the Region's total population, this age category will record marginal declines under Projections II and III (from 65.5 percent to 65.2 and 64 percent, respectively). Only under the low growth Projection I, its share of the Region's total population will be higher at the end of the projection period (67.8 percent) than at the beginning (65.5 percent).

When reviewing the future changes in the age group 65-and-over, we can see from the table that its size at the end of the projection period will be nearly the same under all three projections. This is because the cohorts which will make up this group by the year 2011 are already born and with the same mortality rate assumed for all the projections, their size will vary only as a result of different net migration assumptions.

The age group of elderly people will generally grow at a high rate in the projection period. Its size will increase form 55,600 in 1986 to between 126,400 and 128,400 in the year 2011, which represents a rise of between 127.6 and 131.1 percent. This high rate of growth will increase the relative weight of the elderly in the Region's population from the 1986 level of 7.3 percent to between 11.3 percent (Projection III) and 13.5 percent (Projection I) by the year 2011.

Not only will the size of the 65-and-over population increase rapidly but this group as a whole will also become older. How the aging process will affect this group can be seen if we divide it into two subgroups, those 65-74 and those 75-and-over. In 1986 the 75+ subgroup constituted 38.5 percent of the over 65 population, but at the end of the projection period this group is expected to account for over 45 percent.

The projected age distribution changes in the Region's population, particulary those affecting the young and the elderly can be expected to confront the Region with quite new challenges and problems. The fact that the relative strength of the working age population will not change significantly in the next 25 years means that the total dependency ratio[12] will also remain nearly unchanged. What will happen, however, is that with the process of population aging offsetting shifts will occur between the elderly dependency and the child dependency ratios. The elderly dependency ratio will increase under Projections III and II from 11.2 percent in 1986 to between 17.7 and 18.7 percent, respectively, in the year 2011. The child dependency on the other hand, will decline in the same period from 41.6 percent to 34.6 percent (Projection II) and 38.5 percent (Projection III). The total dependency ratio (combined elderly and child) will increase under these two projections from the 1986 level of 52.7 percent to 53.3 percent (Projection II) and 56.2 percent (Projection III). Only under the slow growth scenario of Projection I the total dependency will decline (to 47.5 percent). The child dependency can be anticipated to be 27.6 percent and that of the elderly 19.9 percent at the end of the projection period. Because the proportions of the working age population will not change significantly in the period under review, the relative amounts of resources available for the dependent population may be nearly the same (Projections II and III) or even slightly larger (Projection I) than before. Still, the projected age composition changes will likely require significant economic (both private and public) and social adjustments in order to meet the differing future needs of the children and the elderly.

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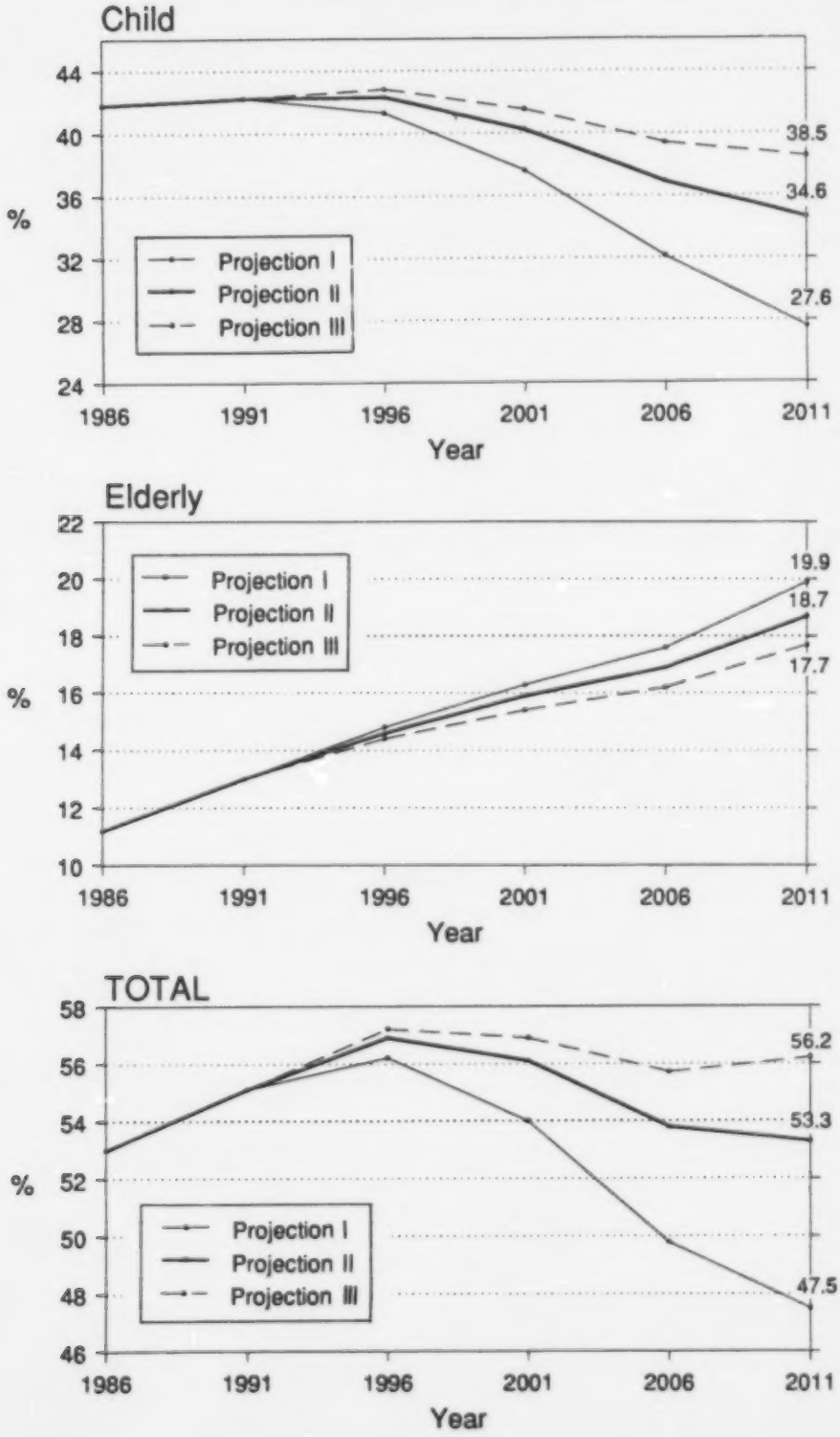
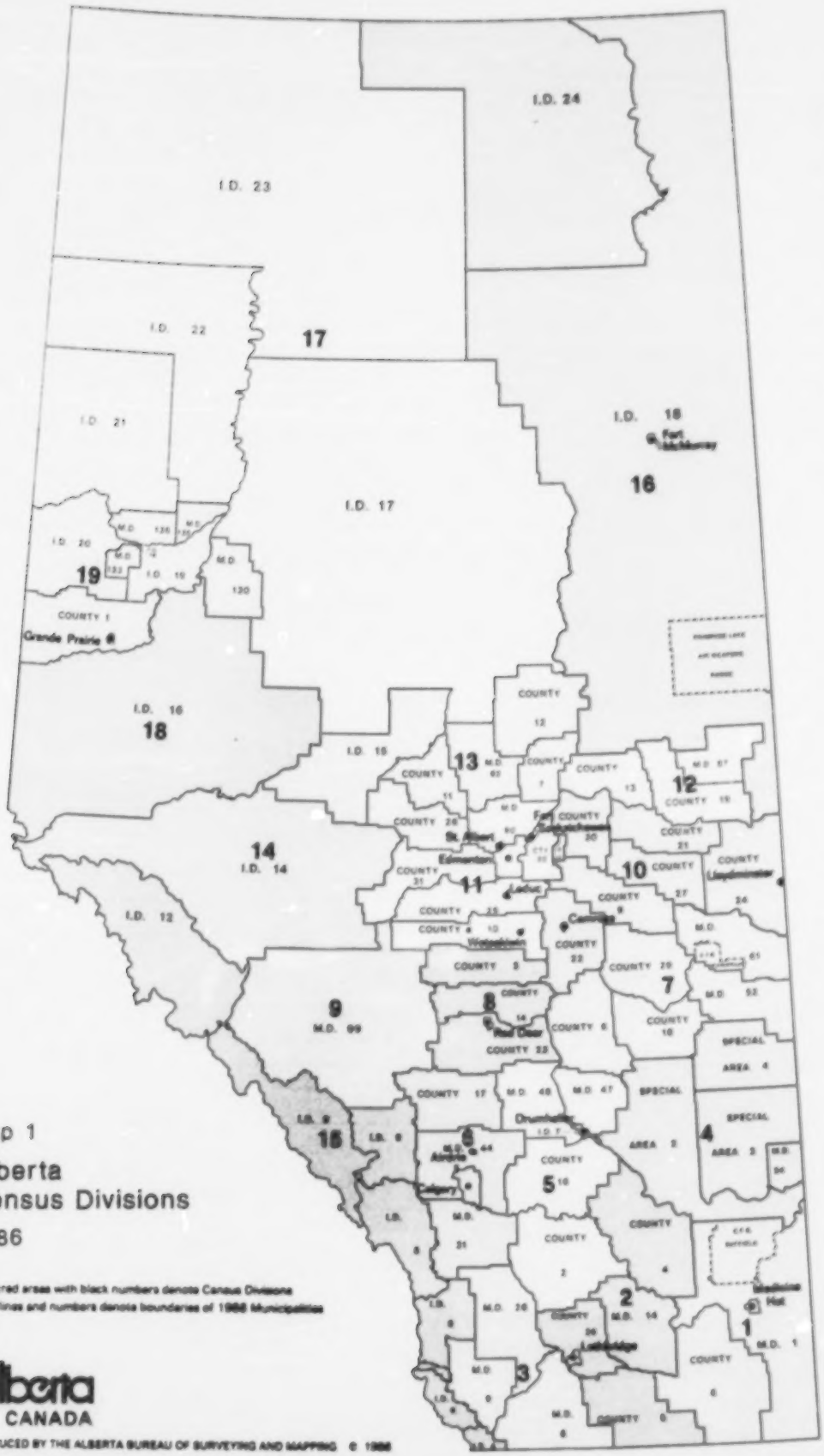
[12]Dependency ratio is the ratio of young and elderly to person of working age; it expresses the number of people of "dependent ages" per 100 persons of "working age."

Figure 5

Dependency Ratios, EMRPC Region 1986-2011, Projection I-III



appendix



Map 1

Alberta
Census Divisions
1986

Coloured areas with black numbers denote Census Divisions
Solid lines and numbers denote boundaries of 1986 Municipalities

Alberta
CANADA

PRODUCED BY THE ALBERTA BUREAU OF SURVEYING AND MAPPING © 1986

TABLE 1

POPULATION PROJECTIONS, NINE SCENARIOS,

EDMONTON METROPOLITAN REGION, 1986 - 2011

Scenarios	1986 actual	1990 actual	1991	1996	2001	2006	2011
I Declining Fertility Low Migration	759,427	801,518	816,230	851,420	894,030	918,420	937,680
II Declining Fertility Medium Migration	759,427	801,518	816,230	875,460	923,500	964,390	1,000,721
III Declining Fertility High Migration	759,427	801,518	816,230	889,500	952,970	1,010,360	1,063.760
IV Constant Fertility Low Migration	759,427	801,518	816,230	866,160	907,030	943,040	978,060
V Constant Fertility Medium Migration	759,427	801,518	816,230	880,270	936,950	990,390	1,044,010
VI Constant Fertility High Migration	759,427	801,518	816,230	894,370	966,880	1,037,730	1,109,960
VII Rising Fertility Low Migration	759,427	801,518	816,230	868,210	912,850	954,470	997.540
VIII Rising Fertility Medium Migration	759,427	801,518	816,230	882,350	942,980	1,002,470	1,064,920
IX Rising Fertility High Migration	759,427	801,518	816,230	896,480	973,110	1,050,460	1,132,300

Assumptions:

Fertility gradually declining from 1.847 in 1986 to 1.35 between 2006 and 2011.
constant at 1.847
gradually rising from 1.847 in 1986 to 2.1 between 2006 and 2011

Fertility was held constant between 1.847 between 1986 and 1991 for all scenarios.
Migration - Low - 1,500 annually to 1991, 1,800 annually thereafter
- Medium - 1,500 annually to 1991, 4,450 annually thereafter
- High - 1,500 annually to 1991, 7,100 annually thereafter

Mortality is gradually declining at a rate which causes mean life expectancy at birth to increase for females from 80.3 years in 1986 to 83 years in the year 2011, for males from 73.3 years in 1986 to 77.2 years in the year 2011.

TABLE 2

POPULATION PROJECTIONS, SELECTED AGE GROUPS

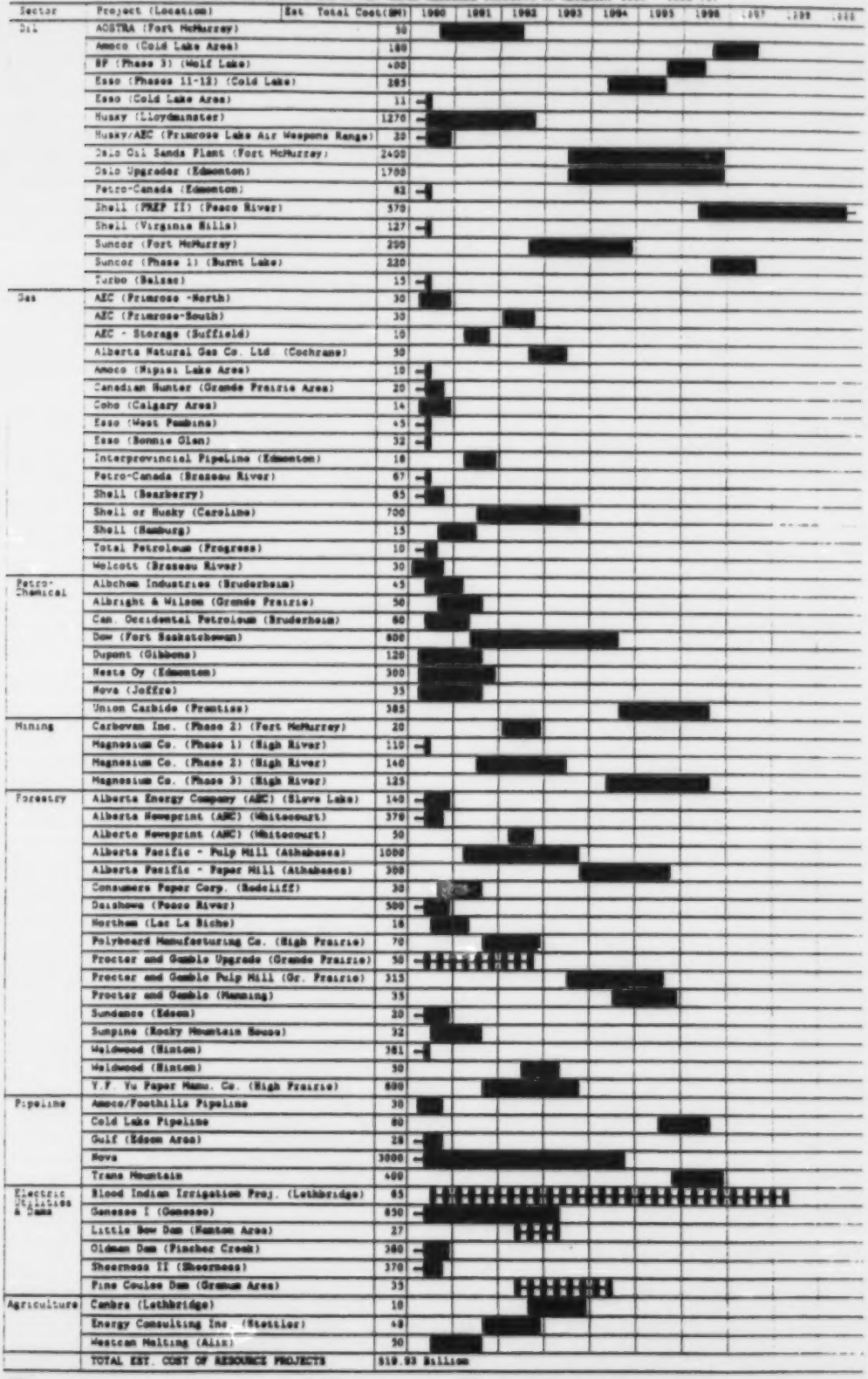
EDMONTON METROPOLITAN REGION 1986 - 2011

PROJECTION I	1986		1991		1996		2001		2006		2011	
0-4	64,120	8.4	68,910	8.4	58,800	6.6	49,360	5.5	44,540	4.9	43,040	4.6
5-17	142,490	18.8	153,010	18.7	168,100	19.6	169,120	18.9	152,570	16.6	132,320	14.1
0-17	206,610	27.2	221,930	27.2	227,900	26.5	218,480	24.4	197,100	21.5	175,360	18.7
18-34	100,690	13.3	80,770	9.9	78,170	9.1	85,750	9.6	96,360	10.5	97,250	10.4
18-64	467, 250	65.5	526,120	64.5	551,660	64.0	580,680	65.0	613,140	66.8	635,690	67.6
65+	55,560	7.3	68,170	8.4	81,660	9.5	94,850	10.6	108,170	11.8	126,430	13.5
TOTAL	759,430	100.0	816,220	100.0	861,420	100.0	894,030	100.0	918,430	100.0	937,640	100.0
PROJECTION II												
0-4	64,120	8.4	68,910	8.4	65,340	7.4	61,260	6.5	61,520	6.2	65,500	6.3
5-17	142,490	18.8	153,010	18.7	171,910	19.5	180,100	19.2	176,100	17.8	170,170	16.3
0-17	206,610	27.2	221,930	27.2	237,250	27.0	241,350	25.8	237,610	24.0	235,670	22.6
18-34	100,690	13.3	80,770	9.9	82,260	9.3	91,580	9.8	103,450	10.4	108,060	10.4
18-64	467,250	65.5	526,120	64.5	560,990	63.7	600,360	64.1	644,900	65.0	680,930	65.2
65+	55,560	7.3	68,170	8.4	82,030	9.3	95,210	10.2	108,780	11.0	127,410	12.2
TOTAL	759,430	100.0	816,220	100.0	880,270	100.0	936,950	100.0	990,360	100.0	1,044,010	100.0
PROJECTION III												
0-4	64,120	8.4	68,910	8.4	68,250	7.7	68,990	7.1	73,380	7.0	81,800	7.2
5-17	142,490	18.8	153,010	18.7	174,720	19.5	188,450	19.4	192,870	18.4	197,190	17.4
0-17	206,610	27.2	221,930	27.2	243,980	27.2	257,440	26.5	266,230	25.3	278,990	24.6
18-34	100,690	13.3	80,770	9.9	86,350	9.6	97,420	10.0	110,540	10.5	117,680	10.4
18-64	467,250	65.5	526,120	64.5	570,310	63.6	620,090	63.7	674,660	64.2	724,920	64.0
65+	55,560	7.3	68,170	8.4	82,190	9.2	95,580	9.8	109,380	10.4	128,380	11.3
TOTAL	759,430	100.0	816,220	100.0	896,480	100.0	973,110	100.0	1,050,460	100.0	1,132,300	100.0

TABLE 3

ACTUAL AND PROJECTED TIMING OF NEW MAJOR RESOURCE PROJECTS IN ALBERTA, 1980 - 1999 (1)

Sector	Project (Location)	Est. Total Cost($M)
Oil	AOSTRA (Fort McMurray)	50
	Amoco (Cold Lake Area)	180
	BP (Phase 3) (Wolf Lake)	400
	Esso (Phases 11-12) (Cold Lake)	285
	Esso (Cold Lake Area)	11
	Husky (Lloydminster)	1270
	Husky/AEC (Primrose Lake Air Weapons Range)	20
	Oslo Oil Sands Plant (Fort McMurray)	2400
	Oslo Upgrader (Edmonton)	1700
	Petro-Canada (Edmonton)	62
	Shell (PREP II) (Peace River)	570
	Shell (Virginia Hills)	127
	Suncor (Fort McMurray)	290
	Suncor (Phase 1) (Burnt Lake)	220
	Turbo (Balzac)	15
Gas	AEC (Primrose -North)	30
	AEC (Primrose-South)	30
	AEC - Storage (Suffield)	10
	Alberta Natural Gas Co. Ltd (Cochrane)	50
	Amoco (Nipisi Lake Area)	10
	Canadian Hunter (Grande Prairie Area)	20
	Cobo (Calgary Area)	14
	Esso (West Pembina)	45
	Esso (Bonnie Glen)	32
	Interprovincial Pipeline (Edmonton)	18
	Petro-Canada (Brazeau River)	67
	Shell (Bearberry)	65
	Shell or Husky (Caroline)	700
	Shell (Hamburg)	15
	Total Petroleum (Progress)	10
	Wolcott (Brazeau River)	30
Petro-Chemical	Albchem Industries (Bruderheim)	45
	Albright & Wilson (Grande Prairie)	50
	Can. Occidental Petroleum (Bruderheim)	60
	Dow (Fort Saskatchewan)	600
	Dupont (Gibbons)	120
	Neste Oy (Edmonton)	300
	Nova (Joffre)	35
	Union Carbide (Prentiss)	385
Mining	Carbovan Inc. (Phase 2) (Fort McMurray)	20
	Magnesium Co. (Phase 1) (High River)	110
	Magnesium Co. (Phase 2) (High River)	140
	Magnesium Co. (Phase 3) (High River)	125
Forestry	Alberta Energy Company (AEC) (Slave Lake)	140
	Alberta Newsprint (AMC) (Whitecourt)	370
	Alberta Newsprint (AMC) (Whitecourt)	50
	Alberta Pacific - Pulp Mill (Athabasca)	1000
	Alberta Pacific - Paper Mill (Athabasca)	300
	Consumers Paper Corp. (Radcliff)	30
	Daishowa (Peace River)	500
	Northem (Lac La Biche)	18
	Polyboard Manufacturing Co. (High Prairie)	70
	Procter and Gamble Upgrade (Grande Prairie)	50
	Procter and Gamble Pulp Mill (Gr. Prairie)	315
	Procter and Gamble (Manning)	35
	Sundance (Edson)	20
	Sunpine (Rocky Mountain House)	32
	Waldwood (Hinton)	381
	Waldwood (Hinton)	50
	Y.F. Yu Paper Manu. Co. (High Prairie)	600
Pipeline	Amoco/Foothills Pipeline	30
	Cold Lake Pipeline	60
	Gulf (Edson Area)	28
	Nova	3000
	Trans Mountain	400
Electric Utilities & Dams	Blood Indian Irrigation Proj. (Lethbridge)	65
	Genesee I (Genesee)	650
	Little Bow Dam (Hanton Area)	27
	Oldman Dam (Pincher Creek)	380
	Sheerness II (Sheerness)	370
	Pine Coulee Dam (Granum Area)	35
Agriculture	Cambra (Lethbridge)	18
	Energy Consulting Inc. (Stettler)	48
	Western Malting (Alix)	30
	TOTAL EST. COST OF RESOURCE PROJECTS	$19.93 Billion



Construction period. Limited construction during period. Construction continues beyond 1999

Construction started before 1980 (1) Includes only actual and announced investment over $10 million

August 27, 1990

Source : Workforce Requirements of Major Alberta Resource Projects 1980 - 1988 Alberta, Career Development and Employment